
Contribution of Satellite and Lunar Laser Ranging to Earth Orientation Monitoring

D.Gambis¹, R. Biancale²

1. Paris Observatory, France
2. CNES Toulouse, France

Abstract

Lunar and Satellite Laser Ranging have been contributing for several decades to Earth orientation variations monitoring. UT0 derived from LLR was used for the period 1976 to 1982 and made the transition between Astrometry and VLBI techniques. Polar motion derived from Lageos observations has a significant contribution in the IERS combinations, mainly thanks to its long term stability. So far Earth orientation parameters and ITRF are derived separately leading to inconsistencies. Rigorous approaches to simultaneously determine a terrestrial reference frame (TRF) and Earth Orientation Parameters (EOP) are now being developed either using SINEX files derived from the different techniques or at the observation level. We present here the results from a coordinated project within the Groupe de Recherches de Geodesie Spatiale (GRGS). Observations of the different techniques VLBI, SLR, LLR, DORIS and GPS) are separately processed by different Analysis centres using the software package GINS DYNAMO. The strength of the method is the use of a set of identical up-to-date models and standards in unique software. The normal equation matrices obtained by the different groups are then stacked to derive weekly solutions of station coordinates and Earth Orientation Parameters (EOP). Results are made available at the IERS site (<ftp://iers1.bkg.bund.de>) in the form of SINEX files.

The analyses we have performed show that for the accuracy and stability of the EOP solution is very sensitive to a number of critical parameters mostly linked to the terrestrial reference frame realization, i.e. minimum constraints application and localities. We present the recent analyses and the latest results obtained.